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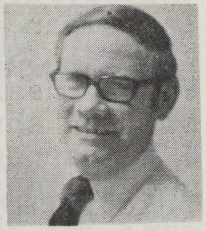
CLUB REPEATER:
WR4ACF (146.04/64)

CLUB CALL:
W4DW

"RALEIGH AMATEUR RADIO SOCIETY NEWS"

AUGUST 1980 ISSUE 126

LEADING EDGE



SHERMAN STARNES
W4TZU

The Phase 3A story continues to unfold. The latest is an autopsy report from a French laboratory which indicates that the Ariane rocket experienced "foreign object damage". Jan King, W3GEY, says that a source in Europe related that the foreign object was an ID tag from a line, wire or other part and that it was in either a propellant or oxidizer line. After nearly 23 years of the space age it seems that everyone would know that cleanliness and parts accountability would be covered in the first chapter of "Everything You Always Wanted To Know About Flying Rockets".

Meanwhile, at AMSAT, discussions with the Department of Defense and with NASA have been initiated to identify possible launch opportunities for the Phase 3B spacecraft. Contacts with the European Space Organization are being maintained as well for the same purpose. Jan King, long the Vice-President for engineering at AMSAT, has been signed to a two-year employment contract with the amateur satellite organization to manage the Phase 3B program.

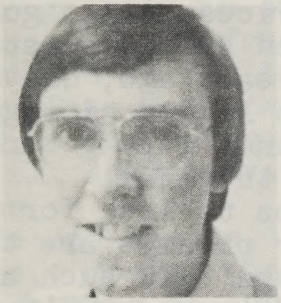
At this time it appears that the next free-world amateur radio satellite will be a package under development at the University of Surrey in England. This AMSAT-UK project is not a communications satellite but an educational and research tool. The planned experiments include a magnetometer to measure the intensity and direction of magnetic forces, a television camera to transmit slow-scan pictures of the Earth and cloud cover, and HF, VHF and Uhf beacons for propagation studies. The telemetry system will relay data to Earth using synthesized speech! This spacecraft should prove useful in the classroom and as the basis for research papers and theses. It is scheduled to be launched piggy-back by NASA with the Solar Mesosphere Explorer in September, 1981. It will be in a low, circular, polar orbit.

The W4DW/4 Field Day satellite effort paid off Sunday morning at 1018 when a CW contact was made through OSCAR 8, mode A. K4NYV was at the key with W4TZU at the antenna controls. The uplink equipment was an IC211 feeding crossed 5-element yagis and the downlink was received with a diamond-shaped 10-meter quad loop and a 75S3. The 2-meter yagi was mounted on the horizontal spreader of the quad loop and the whole array was fully steerable in azimuth and elevation. In addition to an OSCAR-LOCATOR, a BASIC program printout of azimuth and elevation aided in tracking the satellite.

Although OSCAR 8 performs unfailingly under normal conditions, it was not up to the ambitious Field Day program planned for it. The plan was to have both transponders in operation for the Field Day period, but it entered that period with something less than a full battery charge. Saturday night, W4DW/4 heard a command station shut down the mode J transponder. On the AMSAT net Tuesday night we learned that the battery had dropped from 16.2 to 13.4 volts and precipitated the contingency plan to discontinue mode J.

OSCAR 7 seems to have stabilized in the conditions previously described; that is, mode B, daylight only operation due to failed batteries. For a thorough analysis of OSCAR 7 telemetry, see G8OCJ's letter on page 38 of the July QST. Speculation is that the satellite could continue in this relatively useful condition for years. Those same sources

speculate that OSCAR 8 will have a 10 to 20 year lifetime! Notwithstanding, Leading Edge will continue to report on it monthly.



NEWS AND VIEWS
From
NCSU ARC W4ATC
CHARLES OSBORNE, WD4MBK

Last month's column dealt with antennas and positioning on the mast to increase one's gain and coverage area. This time let's see what a little recent technology in transistor preamps can do.

With the proliferation of solid state 60 - 100 watt two meter amps, many of us learn the hard way that being heard farther than you can hear is an unpopular way to operate. Bear in mind that your 100-watt two meter signal can be copied in a good receiver several hundred miles out. It will be strong enough to be a bother to anyone attempting to use the same frequency within about 100 miles. For that reason, let's all strive to stay off main frequencies such as 146.52 and 144.00, except for a meeting and transfer frequency. Sometime I'll have to tape what 146.52 sounds like from our mountaintop contest QTH. It's quite a party line. Don't just tighten the squelch to get rid of QRM. The frequency selector is the knob to reach for. Two meters is a big band with much open space still available.

How do we keep from being, to use a low band term, "alligators"? The best way is to use only enough power to provide comfortable communications. If you close your eyes or do not look at the S-meter, the usable differences between an S-7 signal and a +60 db signal are hardly noticeable. A preamp can help us all lower our power bills by not requiring the person on the other end to use high power and vice versa.

Many hams don't fully realize what has taken place in the last five years. By-products of microminiaturization and solid state materials research have given us low noise transistors and gasfets.

Computers demand high speed switching capability, the faster the better. As tech-

nology replies to this need, we see many new devices capable of VHF/UHF performance arriving as offshoots.

Noise is the key word, however. By noise I mean noise generated within the amplifying semiconductor device itself. It comes by many names: thermal noise, shot noise, current flow bunching, and popcorn noise. All these things are currently being minimized to amazing degrees as new transistor recipes are tried. Low noise transistors enable us to hear stations which would normally be very weak.

A preamp takes these tiny signals (a reasonable antenna is required, as you can't make something from nothing) and amplifies them, usually 10 to 15 db, to a level where the radio's own front end can now take over. Older receivers with noisy front ends often benefit the most from a "good preamp." I say good preamp, because some preamps have a lot of gain but also a lot of noise as well. A weak station may come up from S-1 to S-7 but may be no easier to copy if the no-signal noise level is still only one db below him. An improvement in signal-to-noise level is the only way to improve readability. Ideally, placing a preamp on your two meter rig should not raise the noise level at all. Most do, but the best ones (1.5 db noise figure or better) make the signals simply jump out of the noise, producing phenomenal sensitivities in receivers.

These devices are as good as those used by radio astronomers 15 years ago, only we forgo the liquid nitrogen cooling and finicky tuning problems they had.

Devices to look for in two meter preamps are transistors and FETs such as U310, 3N204, and 3SK48. These devices are all under $4 each, yet when replacing some of the nickel-and-dime front end devices currently used in production radios, they really show an improvement.

As we delve closer to theoretical limits of performance, other things such as line losses become a factor. The more loss in coax and connectors between the actual antenna terminals and the preamp itself, the more the noise figure is degraded. This is very evident in the ICOM 211, for instance. Here we have a 3SK48 in the front end, a very good device offering noise figures as low as 0.6 db in some configurations. However, with a mass of helical resonators and diode switching ahead of it, the noise figure is lucky to

be below 2.5 db. By placing a good one db noise fugure preamp ahead of all these losses, preferably at the antenna, we can see signal to noise improvements of five to 10 db. You must have enough gain to overcome the losses in the front end and feedline to really reap full benefits, otherwise the poor noise figure front end will still degrade your performance.

To do moonbounce, for instance, moving the preamp up the antenna on our 432 array will bring signals from -2 db under the noise up above the noise floor by +2db. You gain much more than just getting around the one db line loss. Its effect, coupled with noise figure, provides dramatic changes when you go around these losses direct to the antenna. I know no one will go this route, since it requires switching relays on the antenna or tower, but the idea is worth explaining.

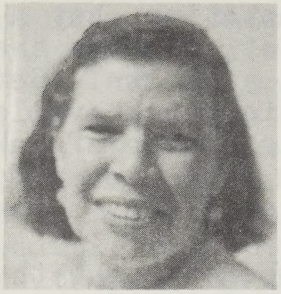
Preamps I'm willing to recommend are first and foremost the Lunar PAE144, followed by Advanced Receiver Research and Janel's best preamps. Expect to pay about $25 - $32. It is worth it, as they are a cut above the rest. Some of the $15 - $20 preamps are worthless and exhibit poor noise figures to begin with. Better yet, in the spirit of amateur experimantation, buy a $4 transistor, such as the 3SK48 and roll your own. Several good designs are available and the satisfaction of making a really good preamp for $10 instead of $30 is a reward in itself.

Remember though, the more sensitive you make your receiver, the more prone it becomes to overload and images. Raw gain is not the answer. For a new, fairly sensitive transceiver, a preamp in the +10 db gain @ 1.4 db NF range should prove a much better performer in our high RF environment of Raleigh. We run cavities to keep all the trash out of our front end on two meters and 432 mHz at NCSU, but that probably isn't necessary for most.

There is an unnerving result of phenomenal sensitivity, however, which you have yet to experience. With your new preamp you'll be able to hear many of those previously unreadable weak signals, yet as the coverage area expands, you'll hear just that many more which are now at the limits of your new sensitivity.

It never ends. Just when you've found the answers, they always change the problems.

73. CU on 2m and 70 cm.



Y LOG

MURRAY HAKE

W6MVZ

K4FHB, Baldy of Burlington, is one shrewd ham. He knew that when you talk to people over ham radio you don't get a bill from Ma Bell. So, before his daughters got away from the family homestead, he convinced them that they should have their ham licenses. One of those daughters is Janet Baldwin, WD4AHS.

Janet Baldwin

Janet got her Novice license in December 1976, and her Tech in the spring of 1978. She is studying Electrical Engineering at NC State and keeps so busy that she doesn't have much time for hamming.

For example, she was Treasurer and then Secreatry of the NC State Radio Club. She will be EE Represenative to the NC SU Engineering Council for the third year beginning this Fall. Last semester she was Chairwoman of the IEEE Student Chapter at NCSU and this Fall will be the vice-Chairperson.

Janet has participated in the 'mountain-topping' for VHF Contests that W4ATC has participated in, but more hamming must wait until she graduates.

STATE OF THE ART W/BERT

Just a short note on a late arrival on the uprocessor scene,--at least, recent for me. We have all heard, and maybe used the Universal Asynchronous Receiver/Transmitter chip or UART. It is also referred to as the Asynchronous Communications Interface Adapter(ACIA).In the asynch or UART mode of operration,the chip can accept from 5 to 8 bits of data from the uprocessor bus and transmit them serially as part of a character on the Transmitter Data(TXD)output.

However, both asynch and synch data are required in data commo. There were several ways these transformations could be accomplished. But now, with the USART(!) chip, both asynch and synch data can be processed with one chip. The conventional USART can even, with a bit of difficulty, be used for SDLC transmission. The moral of this short note is, if a chip doesn't cut the mustard for you today, just add a few letters to the acronym and persevere. HiHi.

W4FMN-OES

MINUTES OF LAST MEETING

ANN BRADLEY, WA4APK

Secretary, RARS

The regular monthly meeting of the Raleigh Amateur Radio Society was held in the West Community Room at Crabtree Valley Mall on July 2, 1980. The meeting was called to order by President "Doc" Cobb, W4YZX, and members and guests were welcomed. Guests this evening were Rick Bilbro, K4KAV; Tim Bilbro, KA4FFU; John Prichard, WA4KBM; Glenn Starling, WB4UGH; W. H. Corper, KA4OXG and Edward Breeden. The roster was signed by 55 persons.

President Cobb made the following announcements:

Upcoming Hamfest dates are...

July 12-13---Charleston, S.C.
July 19-----Cary Swapfest
August 3---Shenandoah Valley Amateur Radio Club Berryville, Va.
August 16-17--Fayetteville,N.C.

The FCC has tentatively approved 10.1 - 10.15 Mhz. for Amateur use, CW only, effective Dec. 15. The FCC has also approved regular FM deviation on 6 meters between 50.1 and 50.25, effective July 15.

Lynn Pendleton, K4NYV, reminded the members that the transmitter hunt will be held on Saturday, July 12, or in case of rain on Sunday, July 13. Participants will meet on the upper deck at Crabtree Valley at 2:00 pm. First prize for a RARS member will be $25.00.

Ron Oates, AA4VK, reported that this year's Field Day showed the best participation thus far. We had 3 stations plus a Novice station with 25 operators participating. Sixty-one persons attended the pig-pickin'. In spite of snakes, mosquitoes and

numerous antenna problems, the Oscar contact proved successful; newspaper publicity was obtained; the message was sent to ARRL and 1100 contacts were logged. It was hoped that the slides would be available for the evening's program; however, there was not sufficient time for the film processing between Sunday and Wednesday's meeting. The slide show will be presented at a later meeting along with further statistics on the Field Day activities. Snapshots taken by WA4APK were available.

Jack Kenny, WB4MCU, reported on the progress of rebuilding and overhauling repeater equipment and some of the problems with the power amplifier.

Rollin Ransom, N4AWR, Hamfest Chairman stated that it is not too soon to get Hamfest plans underway for next year. Committees can be chosen and many of the routine tasks such as the label list can be put out of the way before the Hamfest rush.

Members were asked to think about some space for storage of equipment that RARS has acquired for Hamfest and Field Day, etc. It should all be kept in one place for easy access, and the supplies have rapidly outgrown the space alloted in members' garages.

C. T. West, WD4HSI, commented on the Newsletter and requested members to continue writing articles for publication.

The drawing was held for the door prize with Bill Feehan, WB4EOV, winning the Hy-Gain BN-86 Balun. The meeting was adjourned following coffee, do-nuts, and fellowship.

BERT'S BEAT
WITH
BERT BAILEY, W4FMN

HUNTING OSCAR 8

Below is a table for tracking Oscar8.Times have been converted to local(EDST)time Initial orbits were taken from QST;time for each orbit increased by 103.2 minutes; and degrees W. longitude increased by 28.2 degrees. Note that only those orbits that can be tracked in Raleigh are computed. Also, since the initial data are obtained in GMT the first orbit listed for each day will, if listed as being 2200hours, will actually be an orbit appearing the day before. For example, the first orbit listed for 6Aug shows a time of 2254. This time is really for 5Aug. Data computed using TRS80 computers at Wake Tech, the home of WB4TOP.

Bert, Trustee,Wake Tech ARC

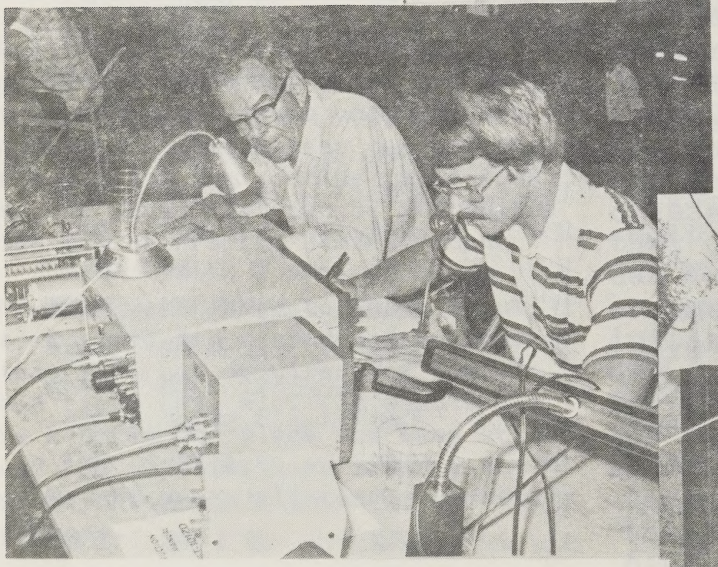
OSCAR 8 PROGRAM BY WA7MIN FOR THE MONTH OF AUG 88

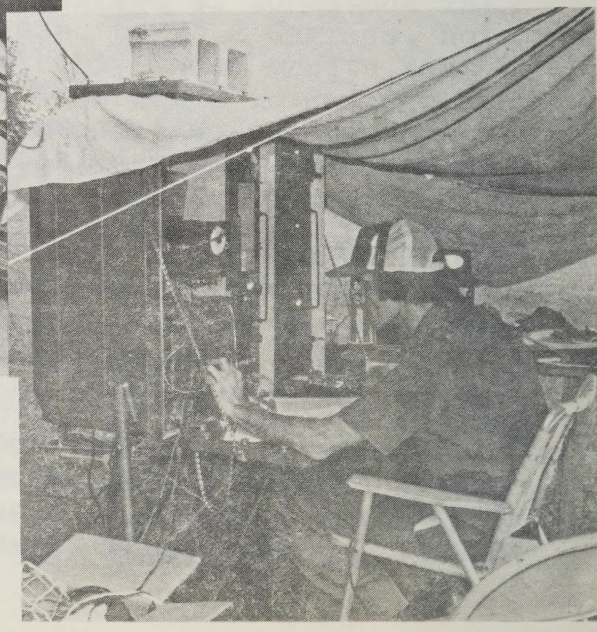
DAY	ORBIT NO.	TIME	LONG
1	12267	0 47	65.1
1	12268	22 38.2	90.9
1	12274	8 49.4	245.7
1	12275	10 32.6	271.5
1	12280	19 8.60004	40.5
1	12281	20 51.8	66.3
2	12282	22 35	92.1
2	12288	8 54.2001	246.9
2	12289	10 37.4001	272.7
2	12294	19 13.4001	41.6999
2	12295	20 56.6001	67.4999
3	12296	22 39.8001	93.2999
3	12302	8 59.0001	248.1
3	12303	10 42.2001	273.9
3	12308	19 18.2001	42.8999
3	12309	21 1.4001	68.6999
4	12310	22 44.6001	94.4999
4	12316	9 3.80012	249.3
4	12317	10 47.0001	275.1
4	12322	19 23.0001	44.0998
4	12323	21 6.20014	69.8998
5	12324	22 49.4001	95.6998
5	12330	9 8.60016	250.5
5	12331	10 51.8002	276.3
5	12336	19 27.8002	45.2998
5	12337	21 11.0002	71.0998
6	12338	22 54.2002	96.8998
6	12343	7 30.2002	225.9
6	12344	9 13.4002	251.7
6	12345	10 56.6002	277.5
6	12350	19 32.6002	46.4997
6	12351	21 15.8002	72.2997
7	12352	22 59.0002	98.0997
7	12357	7 35.0002	227.1
7	12358	9 18.2002	252.9
7	12359	11 1.40023	278.7
7	12364	19 37.4002	47.6997
7	12365	21 20.6002	73.4997
8	12366	23 3.80024	99.2997
8	12371	7 39.8003	228.3
8	12372	9 23.0003	254.1
8	12373	11 6.20026	279.9
8	12378	19 42.2003	48.8996
8	12379	21 25.4003	74.6996
9	12380	23 8.60028	100.5
9	12385	7 44.6003	229.5
9	12386	9 27.8003	255.3
9	12387	11 11.0003	281.1
9	12392	19 47.0003	50.8996
9	12393	21 30.2003	75.8996
10	12394	23 13.4003	101.7
10	12399	7 49.4003	230.7
10	12400	9 32.6003	256.5
10	12401	11 15.8003	282.3
10	12406	19 51.8003	51.2995
10	12407	21 35.0003	77.0995
11	12408	23 18.2003	102.9
11	12413	7 54.2004	231.9
11	12414	9 37.4004	257.7
11	12415	11 20.6004	283.5
11	12420	19 56.6004	52.4995
11	12421	21 39.8004	78.2995
12	12422	23 23.0004	104.099
12	12427	7 59.0004	233.1
12	12428	9 42.2004	258.9
12	12429	11 25.4004	284.699
12	12434	20 1.40041	53.6994
12	12435	21 44.6004	79.4994
13	12441	8 3.80043	234.299
13	12442	9 47.0004	260.099
13	12443	11 30.2004	285.899
13	12448	20 6.20045	54.8994

Raleigh Amateur Radio Society

Field Day scenes, June 28-29,

1980

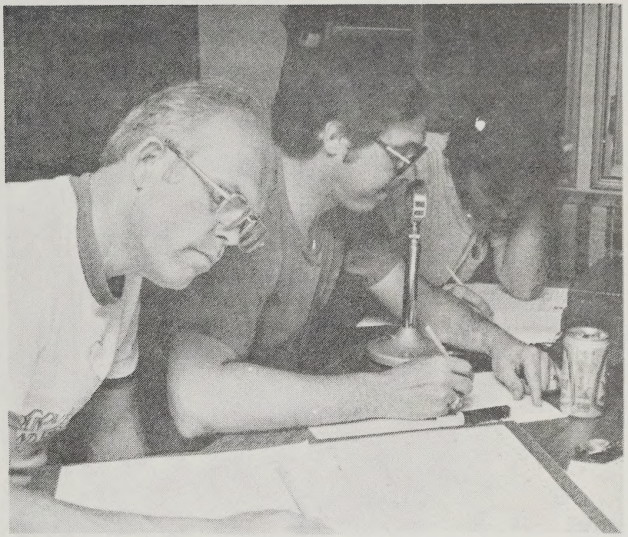


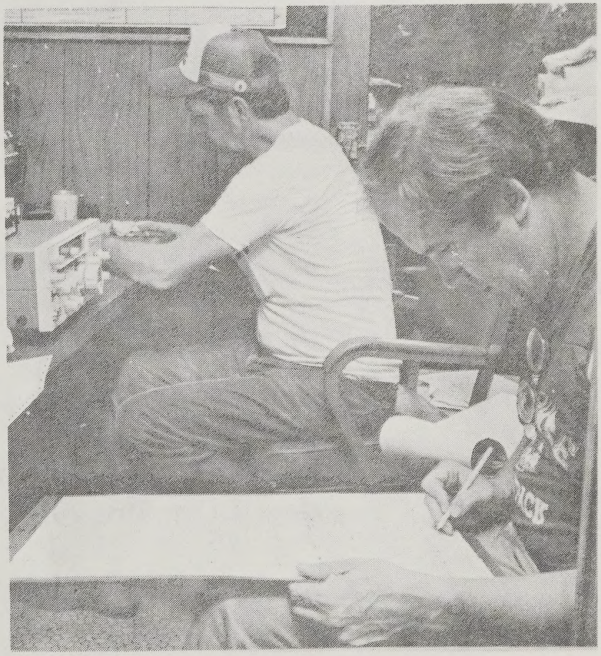


Cary Amateur Radio Society

Field Day scenes, June 28-29,

1980





Field Day photographs by Charles Clark, WD4PJV, of RARS.

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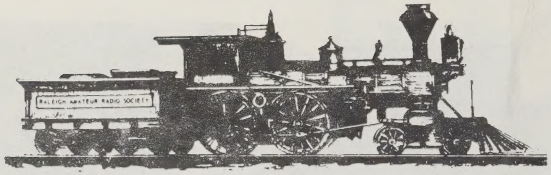

RARS

RARS meets each first Wednesday at 7:30 p.m. in the
West Community Room of Crabtree Valley Mall.

RARS TWO METER FM NET — Meets 8:00 p.m. every night
146.04/146.64 Repeater
RARS 10 METER SSB NET — Monday, Tuesday, Thursday, Friday Nights
7:00 p.m. — 28.540 MHz